Problem Statement / Assignment

Options Fiesta Summer Project
Finance And Analytics Club, IIT Kanpur

Deadline: 28th May 2025

Disclaimer: The following assignment aims to implement a trading strategy. Do the questions sequentially, and you will have your first automated trading strategy with you to trade with. We again advise you to refrain from any use of plagiarism, as it affects your ratification. For submission, you are required to submit separate .ipynb files for each question (Remember to run all cells before submission).

Some qustions will need a dataset to work with. You need to use the time series of a nifty50 in the years 2022-2024, on a 1 day timeframe. Also, note that all your technical indicators should be a function that take the dataset as an input, and return the same dataset after modifications.

Question 1. The first question is on technical indicators. You are required to code **ALL** the indicators in the given table. Remember to make functions.

Bollinger Bands	MACD	Stochastic Oscillator
VWAP	Relative Strength Index	Average True Range

Question 2. This question is for signal generation. You need to create a signal generating function for each indicator that you have coded in the previous question. Use these functions on the specified dataset and print the number of buy / sell signals you get from the function.

Question 3. Now for the finale: You need to code your own backtesting agent/engine. The engine will take the dataset as an input. Note that you will take your initial capital as 1,000 INR and will use all your capital in a long trade(compounding). Also note that, if your backtesting engine incorporates short trades, then remember to complete the trade within the next 5 days.

Derivables: Your backtesting agent shall perform the operations of long trades, possibly short trades, stop loss(trailing will give better results) and take profit. Provide your python .ipynb notebook as a part of your submission. Your backtestng framework should calculate the cummulative returns, sharpe ratio, maximum drawdown, overall total trades, total number of winning/losing trades (Do check that the number of winning and losing trades combined should be the total number of trades). The main derivable needed is a

report that has a description of your trading strategy and risk management, the summary of your evaluation metrics, and importantly a few graphs: your partfolio value over time, the drawdown, and your stock price which visually shows all your entry and exit points.

Question 4. (Optional)

- You can use hourly or 30-minute timeframe data for your trades.
- Use Real world trading extensions like leverage and transaction costs.
- Compare your evaluation metrics for multiple stocks, via a table.
- Try optimising your traing parameters, say MA window, via grid search.

If you need more material for these concepts, do put a message in the whatsapp 'group'.